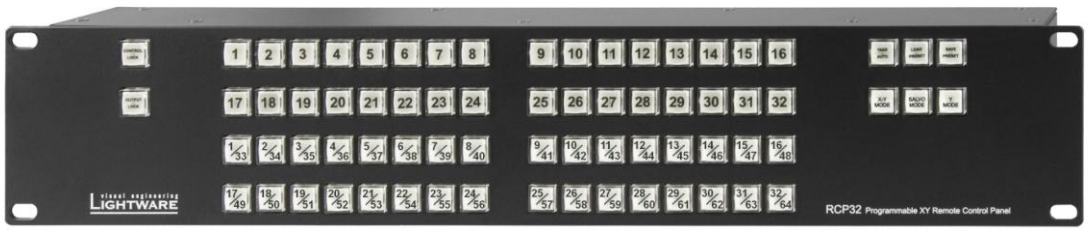
visual engineering
LIGHTWARE

User's Manual

MX-RCP16
MX-RCP32



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1. Introduction

1.1. Description

Lightware MX-RCP16 and MX-RCP32 are remote control panels for controlling Lightware matrix routers. Additionally the control panels support group commands (salvo) or can be used as universal device control with a simple protocol.

The control panels have illuminated and easily relegendable front panel buttons and an Ethernet LAN port for connecting to the controlled device.

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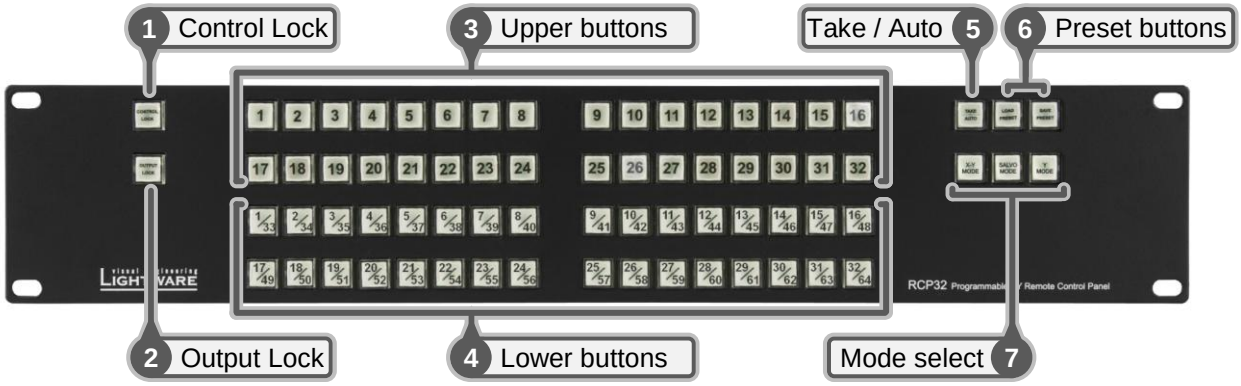
1.2. Front panel view



1	**Control Lock**	Disables or enables front panel operation. *More info: 4.2.1.*
2	**Output Lock**	Inhibits accidental input changing on selected output(s). *More info: 4.2.5.*
3	**Upper buttons**	Upper buttons may refer to input/output ports, presets or salvo commands, depending on the mode of operation. *More info: 4.1.*
4	**Lower buttons**	Lower buttons may refer to input/output ports, presets or salvo commands, depending on the mode of operation. *More info: 4.1.*
5	**Take / Auto**	Toggles and displays the actual switching mode (TAKE or AUTOTAKE; available only in X-Y operation mode). *More info: 4.2.2.*
6	**Load Preset**	Loads a previously saved crosspoint configuration.
	Save Preset	Stores actual matrix state, in one of the preset memories. *More info: 4.2.7.*
7	**Mode select**	The operation mode can be selected with these buttons. The button of the active mode lights continuously. *More info: 4.1.*

1.3. Rear view

1	**DC power**	Receptacle for power external 5V DC adaptor.
2	**CPU live**	CPU live LED blinks to indicate normal operation.
3	**Ethernet port**	RJ45 connector for connecting the unit to Local Area Network (LAN). *More info:* Hiba! A hivatkozási forrás nem található..
4	**DIP settings**	Communication protocol and other special settings can be configured with this switch. *More info: 3.1.*

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2. Installation

The RCPs can be used to remote control matrix routers, or as a simple button array to control any device through a simple protocol. The below guide describes how to build and configure these systems.

2.1. Matrix router control system

2.1.1. Building the system

Step 1. Install a Lightware matrix router with sources and displays as needed.

Step 2. Connect the matrix to a network hub, switch or router with its Ethernet port.

Step 3. Connect the RCP to the same network as the matrix.

a) One RCP unit can connect to one matrix router

b) More RCP units can connect to the same matrix router depending on the router's Webserver firmware version.

Step 4. Set the RCP unit's protocol to 0, 1, 2, 4 or 5 with the DIP switch.

Step 5. Power up the devices.

2.1.2. Configuring the system

Step 1. Check that the RCP unit protocol is set to 0, 1, 2, 4 or 5.

Step 2. Set the controlled matrix to fix IP configuration, and set the IP address manually. Remember the IP address and the port number.

a) This can be done through the front panel LCD on the matrix or with the Matrix Controller software remotely.

Step 3. Connect to the RCP with the Matrix Controller software.

a) The RCP has a fix IP address as factory default: 192.168.254.254. To change this, use a crosslink UTP cable and connect the unit directly to your computer's Ethernet port. Or enable DHCP through the front panel buttons. More info: *3.1.2*.

b) The three operation mode buttons will blink green until the RCP unit is in configuration mode.

Step 4. Set the IP address and port of the matrix as the target IP address and port.

Step 5. Close the Matrix Controller software to disconnect from the RCP.

Step 6. The RCP automatically tries to connect to the matrix on the set IP address. If the connection could not be established, the "OUTPUT LOCK" button blinks continuously.

Step 7. The system is ready to use. The RCP will function just as it would be the front panel control of the connected matrix router.

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2.2. Universal device control system

The RCP can operate as a universal device controller (UDC). In this mode the RCP sends a command regarding each button press or release. These commands can be processed by a third party device. On the other hand, the RCP can take commands to control its built-in LEDs.

2.2.1. Building the system

Step 1. Prepare a device that implements the UDC protocol (UDC server).

Step 2. Connect the UDC server to a network hub, switch or router.

Step 3. Connect one or more RCP units to the same network. (One RCP can connect to one UDC server at a time, but several RCPs could connect to the UDC server depending on its configuration.)

Step 4. Set the RCP unit's protocol to 3 with the DIP switch.

Step 5. Power up the devices.

2.2.2. Configuring the system

Step 1. Check that the RCP unit protocol is set to 3.

Step 2. Set the UDC server to a fix IP address and port number.

Step 3. Connect to the RCP with the Matrix Controller software.

a) The RCP has a fix IP address as factory default: 192.168.254.254. To change this, use a crosslink UTP cable and connect the unit directly to your computer's Ethernet port. Or enable DHCP through the front panel buttons. More info: *3.1.2*.

b) The three operation mode buttons will blink green until the RCP unit is in configuration mode.

Step 4. Set the IP address and port number of the UDC server as the target IP address and port number.

Step 5. Close the Matrix Controller software to disconnect from the RCP.

Step 6. The RCP automatically tries to connect to the UDC server on the set IP address. (There is no automatic indication to show whether the connection is established or not. The server should detect the connection and send some commands for the RCP unit to generate indication.)

Step 7. The system is ready to use. The RCP will send a command if a button is pressed down or released. The LEDs can be switched ON/OFF/BLINK by sending command to the RCP.

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3. Configuration

3.1. Settings on the unit

3.1.1. Setting the communication protocol

Changing

The communication protocol can be changed on the rear of the unit:

Step 1. Set the DIP switch as a binary representation of the protocol number.

0	1	2	3	4	5
Lightware	Lightware	Secondary	UDC	Lightware (free salvo)	Secondary (free salvo)

Step 2. Check the protocol on the front panel as described above.

Viewing

The communication protocol can be checked on the front panel (except UDC):

Step 1. Press and hold the Control Lock button for 4 seconds. (Control Lock button lights in up red continuously).

Step 2. Press and keep pressed the Output Lock button. The current protocol indication will light up.

3.1.2. Resetting the IP address

The unit's Ethernet port can be set to factory default IP configuration or to DHCP mode with front panel buttons. To set the IP configuration perform the following:

Step 1. Ensure that there is no active connection on the Ethernet port. You have to unplug the LAN cable.

Step 2. Press and hold the Control Lock button for 4 seconds. (Control Lock button lights in up red continuously).

Step 3. Press and keep pressed the Output Lock button (the current protocol indication will light up).

Step 4. Press and release the

a) **Load Preset** button to set the **factory default IP** settings

IP address:	192.168.254.254
port number:	10001
subnet mask:	255.255.0.0
gateway:	0.0.0.0

b) **Save Preset** button to set **DHCP enabled**

IP address:	Acquired with DHCP
port number:	unchanged
subnet mask:	unchanged
gateway:	unchanged

Step 5. A light sequence will occur to confirm the command. (Save Preset, Load Preset and Take/Auto buttons will light up one after the other.)

Step 6. Reinsert the LAN cable to the Ethernet port.

Step 7. The RCP unit will restart, and try to connect to the set target IP address.

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3.2. Settings with Lightware Matrix Controller software

Some special functions of the RCP unit can be only configured using Lightware Matrix Controller from a Windows PC or Laptop through Ethernet port.

Please see section 4.5 about using the Matrix Controller Software to:

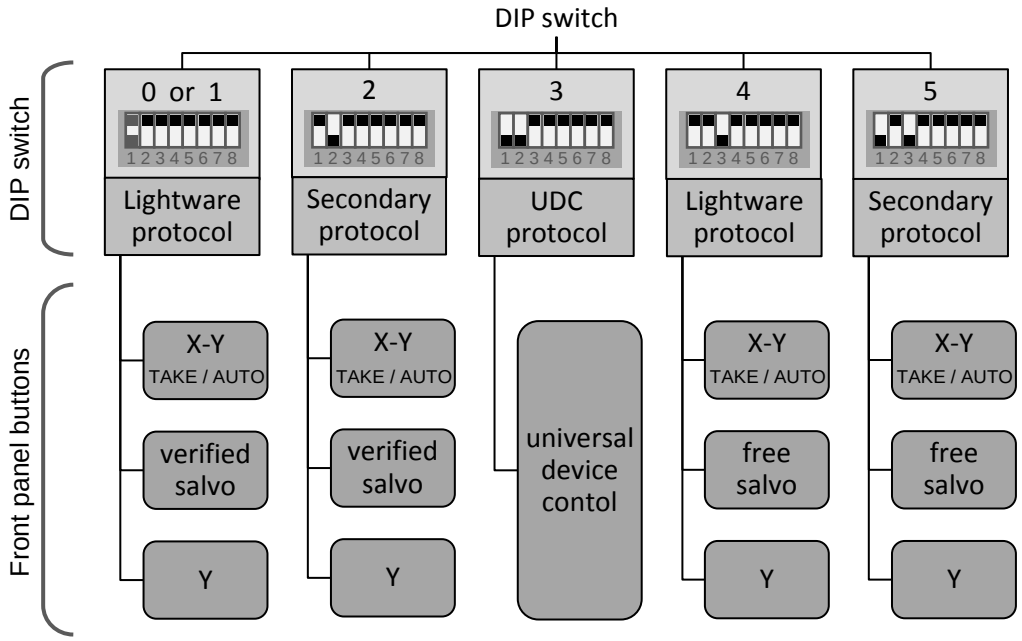
- set up the controlled target IP address (see 5.3.1)
- set up salvo commands (see 5.3.2)
- configure RCP IP settings (see 5.4.1)

4. Operation

4.1. Operational modes overview

The remote control panels can communicate with different protocols, and they have several operational modes.

The communication protocol can be set with a DIP switch on the rear of the unit. The use of different protocols depends on the application and the device that has to be controlled. Regarding to the selected protocol the controller has some operation modes which can be selected with front panel buttons.



4.1.1. Matrix control protocols

The “Lightware” and the “Secondary” protocols are used to control matrix routers. The RCP unit can work in three operational modes to best suit your application.

X-Y mode

In this mode, the remote control panel functions just as if it would be the front side control panel of a matrix. Each button is dedicated to an input or an output of the matrix router that the RCP is connected to. This operation mode has two switching modes: TAKE and AUTOTAKE.

Y mode

The Y mode is most useful if the RCP is used as an input selector for a specific output. While the Y button is pressed, the affected output can be selected. After the button is released, every button is dedicated to an input of the matrix router that the RCP is connected to.

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Salvo modes

The salvo mode makes possible to execute a sequence of commands with a single button. In this mode the buttons are not dedicated to I/O ports, but each button can have its own command sequence that is executed if the button is pressed.

Verified salvo mode

The command sequence can contain any switching command. The RCP checks the response from the matrix and verifies if the crosspoint state matches with the issued commands.

Free salvo mode

The command sequence can contain anything. The response is not monitored, the last pressed salvo button lights until another is pressed.

4.1.2. Universal device control protocol

The UDC protocol is developed to create a simple button array that can be used as a universal device controller. The RCP sends a command regarding each button press or release. These commands can be processed by a third party device. On the other hand, the RCP can take commands to control its built-in LEDs.

4.2. Front panel operations in X-Y mode

The X-Y mode is active when the X-Y button lights on the front panel. In this mode, the remote control panel functions almost the same as if it would be the front side control panel of a matrix. There are minor differences due to the remote communication delay and because the RCP may have more I/O buttons as the controlled matrix.

Each button is dedicated to an input or an output of the matrix router that the RCP is connected to. The upper buttons refer to inputs and the lower buttons refer to outputs. This way the MX-RCP16 has 16 source buttons and 16 destination buttons, while the MX-RCP32 has 32 source buttons and 32 destination buttons. In this manner, this mode is most efficient when the RCP has at least as much buttons as the controlled router. (The upper numbered ports of a 32x32 matrix will be unreachable with this mode when using an MX-RCP16.)

If a button is pressed on the RCP that refers to a higher numbered I/O port than the matrix frame size, the button gives a short flash to indicate press, but otherwise it is ignored.

4.2.1. CONTROL LOCK

Front panel button operations on the RCP unit can be enabled or disabled using CONTROL LOCK button. This does not affect the front panel control on the router itself, neither the Serial nor Ethernet control from another RCP unit. If the button is not illuminated, front panel button operations are enabled. If it illuminates red continuously, front panel operations are inhibited.

Press and hold the CONTROL LOCK button for 3 seconds to toggle the control lock state.

4.2.2. TAKE / AUTOTAKE modes

The RCP has two switching modes in X-Y operation mode: TAKE and AUTOTAKE. If the TAKE / AUTO button is unlit, TAKE mode is active. When the TAKE / AUTO button continuously lights green, AUTOTAKE mode is selected.

Press and hold the TAKE button for three seconds to toggle between TAKE and AUTOTAKE modes.

TAKE mode allows the user to make multiple connections and disconnections at once. This mode is useful when time delay is not allowed between multiple

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switching. The commands are only realized when the TAKE button is pressed. If no button is pressed for two seconds, all preselected actions (which were not realized with pressing TAKE) will be ignored, and the RCP returns to its idle state.

AUTOTAKE mode is useful when immediate actions must be done or fast switching is needed between sources on a particular destination. In this mode switching occurs immediately upon pressing one of the input selector buttons.

4.2.3. Viewing crosspoint state

User can check the current crosspoint status of the connected router on the RCP unit. This status view feature is slightly different in TAKE or AUTOTAKE modes because of different switching philosophy of the two modes.

Info *Status view occurs whenever the router has to be switched. After entering the view state, the user can change the routing configuration. Viewing and switching can be done after each other, or if nothing is pressed for three seconds, the RCP returns to idle state.*

View current state in TAKE mode

If all source and destination buttons and TAKE button are unlit (the unit is in TAKE mode, and no input was selected in last 3 seconds), user can verify both input and output connections. This informative display will remain for 3 seconds, and then all button lamps go out. In TAKE mode no accidental change can be done unless TAKE button is pressed.

For viewing **input connections**, press and release a source button. Now the selected source button and all destination buttons will light up which are currently connected to the selected source.

For viewing **output connections**, press and release a destination button. Now the source button which is connected to the selected destination will light up. If no source button is lighting, the selected destination is disconnected from any source, or is in muted state.

View current state in AUTOTAKE mode

In AUTOTAKE mode only states of destinations can be viewed.

Press and release the required destination button. Now the source button which is connected to the selected destination will light up. If no source button is lighting, the selected destination is disconnected from any source, or is in muted state. By pressing another destination button, the state of that destination can be seen.

Info *Be careful, as in AUTOTAKE mode if a source button is pressed, it is immediately connected to the last selected destination.*

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4.2.4. Switching in X-Y mode

Creating connections and disconenctions in TAKE mode

Step 1. First press and release the desired source button. The pressed source button and all destination buttons which are currently connected to this source will light up. The dark destination buttons are not connected to this source. This is an informative display about current status of the selected input (view only).

Step 2. Press and release the desired destination button(s) which has to be **connected** to the selected source. The preselected destination button(s) start(s) blinking.

Step 3. Press and release any green lighting destination button which has to be **disconnected** from the selected source. The pressed destination(s) turn(s) dark.

Step 4. Press and release TAKE button to execute the tie(s). Now the selected input is switched to the selected output(s) and disconnected from the deselected output(s).

Info *Deselected destinations are disconnected from any source, thus output devices will display black image or "no signal" message, or automatically will turn off.*

Creating a connection or disconnection in AUTOTAKE mode

Step 1. Press and release the desired destination button. The pressed destination button, and the actually connected source button light up green. If no source is connected (the output is muted) no source button will light up.

Step 2. To **connect** another source, press and release the desired input button. The switch action will be executed immediately. Switching between sources to the selected destination can be done directly.

Step 3. To **disconnect** the output from any sources, press and release the current input button that lights green. The switch action will be executed immediately and the output is disconnected.

Info *Deselected destinations are disconnected from any source, thus output devices will display black or blue image or "no signal" message and may automatically turn off.*

4.2.5. OUTPUT LOCK

Lightware routers can lock a destination's state. This feature prevents an accidental switching to the locked destination in case of important signal. Locking a destination means, that no input selection or muting can be executed on that particular destination.

Destinations can be independently locked or unlocked through an RCP unit. Locking a destination does not affect other destinations.

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Viewing or changing output lock states in TAKE mode

Step 1. Press and release the Output Lock button.

Step 2. The Output Lock button and all the buttons of any locked destinations light up, and remain illuminated for two seconds (view state).

Step 3. If no button is pressed for three seconds, the router returns to idle state.

Step 4. To change an output's lock state:

a) If an unlit output button is pressed, it starts to blink, to indicate that it is preselected for output locking.

b) If an illuminating output button is pressed, it goes off, to indicate that it is preselected for unlocking.

Step 5. Press and release TAKE button. The preselected output lock states are changed.

Viewing or changing output lock states in AUTOTAKE mode

In AUTOTAKE mode a destination is selected all the time. Therefore the currently selected output and input buttons are illuminated. The Output Lock button illuminates regarding to the lock state of the current output.

Viewing all locked outputs is not possible is AUTOTAKE mode, as pressing the Output Lock button instantly locks or unlocks the current output.

Step 1. Press and release the desired destination button. Now the selected destination button and the currently connected source button light up (view mode).

Step 2. The Output Lock button lights regarding if the selected output is locked.

Step 3. To toggle lock state on the selected output, press and release the Output Lock button.

a) If the output was previously unlocked, the Output Lock button was not illuminated. Pressing the Output Lock button activates the lock function at once.

b) If the output was previously locked, the Output Lock button was illuminated. Pressing the Output Lock button deactivates the lock function at once.

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4.2.6. Switching operations flowchart in X-Y mode

To better understand the viewing and switching sequence in TAKE and AUTOTAKE modes, please study the below diagrams.

TAKE mode

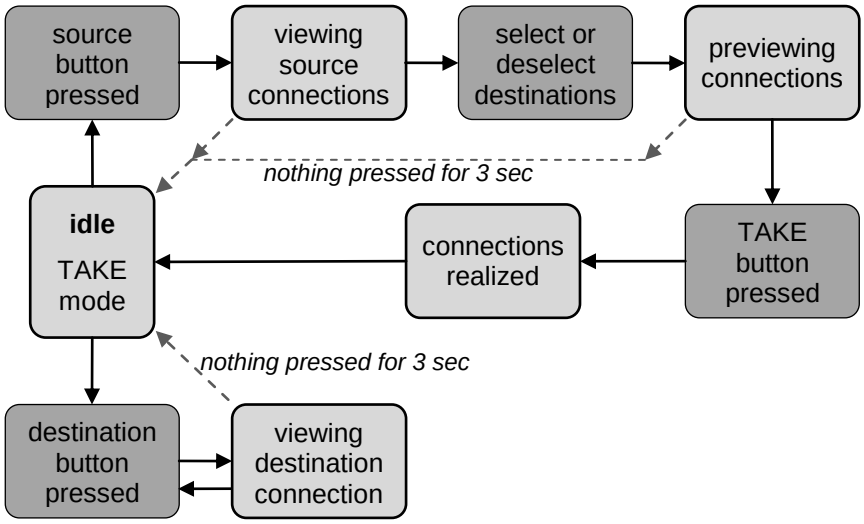

Figure 4-1. Switching flowchart in TAKE mode

AUTOTAKE mode

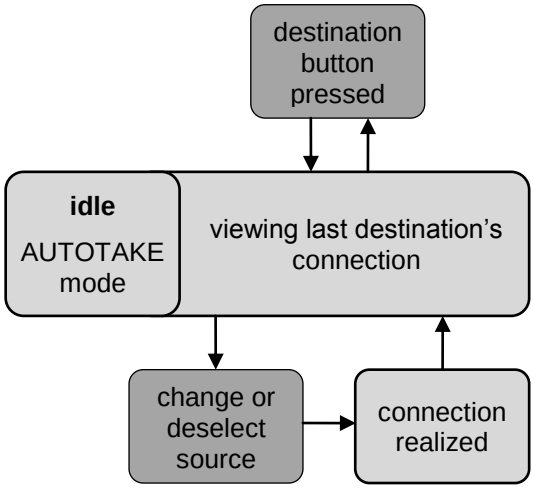

Figure 4-2. Switching flowchart in AUTOTAKE mode

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4.2.7. Preset operations

Lightware matrix routers have 32 user programmable presets. Each preset stores a configuration regarding all input connections and mute state for all outputs. All presets are stored in a non volatile memory; the router keeps presets even in case of power down. Memory numbers are assigned to source buttons 1..16 on MX-RCP16 and 1..32 on MX-RCP32.

Saving a Preset in TAKE mode

Step 1. Create the desired connections which have to be saved.

Step 2. Press and release the SAVE PRESET button.

Step 3. Press and release a source button according to the desired memory address (source 1 to 16 or to 32).

Step 4. Press and release TAKE button. Now the current configuration is stored in the selected memory.

Info *Preset save action always stores the current configuration for all outputs including mute state, but ignoring lock state.*

Loading a Preset in TAKE mode

Step 1. Press and release LOAD PRESET button.

Step 2. Press and release a source button according to the desired memory address (source 1 to 16 or to 32).

Step 3. Press and release TAKE button. Now the selected preset is loaded.

Info *Loading a preset modifies all output states that are not currently locked.*

Saving a Preset in AUTOTAKE mode

Step 1. Create the desired connections which have to be saved.

Step 2. Press and release SAVE PRESET button.

Step 3. Press and release a source button according to the desired memory address (source 1 to 16 or to 32). Now the current configuration is stored in the selected memory.

Info *Preset save action always stores the current configuration for all outputs including mute state, but ignoring lock state.*

Loading a Preset in AUTOTAKE mode

Step 1. Press and release LOAD PRESET button.

Step 2. Press and release a source button according to the desired memory address (source 1 to 16 or to 32). Now the selected preset is loaded.

Info *Loading a preset modifies all output states that are not currently locked.*

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4.3. Front panel operations in Y mode

The Y mode is active when the Y button lights on the front panel. While the Y button is pressed, the affected output can be selected. After the button is released, every button is dedicated to inputs of the matrix router that the RCP is connected to. Pressing an I/O button while the Y button is released executes the switching at once on the last selected output. The affected output can be easily changed by pressing and holding the Y button, and pressing the port number of the desired output.

All buttons are dedicated to inputs when the Y button is released. All buttons are dedicated to outputs while the Y button is pressed. This way sources and destinations can be selected from port 1-32 with MX-RCP16 and 1-64 with MX-RCP32.

TAKE / AUTO, Load Preset and Save Preset buttons are disabled in this mode.

4.3.1. CONTROL LOCK

Front panel button operations on the RCP unit can be enabled or disabled using CONTROL LOCK button. This does not affect the front panel control on the router itself, neither the Serial nor Ethernet control from another RCP unit. If the button is not illuminated, front panel button operations are enabled. If it illuminates red continuously, front panel operations are inhibited.

Press and hold the CONTROL LOCK button for 3 seconds to toggle the control lock state.

4.3.2. Switching in Y mode

Step 1. Press and keep pressed the Y-mode button. The button of the affected output port lights.

Step 2. To change the affected output port, hold the Y-mode button down and press the desired output number.

Step 3. Release the Y-mode button. The button of the currently connected input port lights up.

Step 4. To change the source, press any of the numbered buttons. (1-32 on the MX-RCP16 and 1-64 on the MX-RCP32.)

Step 5. The switching is done at once. The newly selected source is connected to the affected destination.

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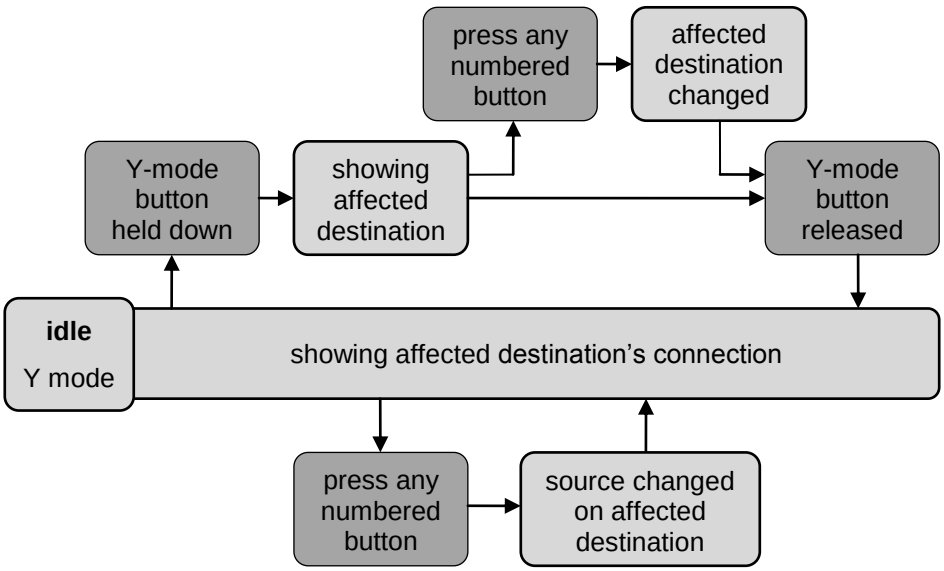
4.3.3. Switching operations flowchart in Y mode



4.4. Front panel operations in SALVO mode

Salvo mode is active when the SALVO button lights on the front panel. In this mode the buttons are not dedicated to an input or an output port of the connected matrix. Each button can have its own command sequence that is executed if the button is pressed. The command sequences can be programmed to the RCP with the Matrix Controller software.

TAKE / AUTO, Load Preset and Save Preset buttons are disabled in this mode.

Verified salvo mode

The command sequence can contain any switching command according to the selected protocol (Lightware or secondary protocol). The RCP checks the response from the matrix and verifies if the crosspoint state matches with the issued commands. The button will light only if all the commands were successfully executed, and the matrix configuration is in accordance with the command sequence. If the crosspoint configuration does not match with the sent commands, the button blinks.

Free salvo mode

The command sequence can contain anything. The response is not monitored, the last pressed salvo button lights until another is pressed.

4.4.1. CONTROL LOCK

Front panel button operations on the RCP unit can be enabled or disabled using CONTROL LOCK button. This does not affect the front panel control on the router itself, neither the Serial nor Ethernet control from another RCP unit. If the button is not illuminated, front panel button operations are enabled. If it illuminates red continuously, front panel operations are inhibited.

Press and hold the CONTROL LOCK button for 3 seconds to toggle the control lock state.

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4.4.2. Executing salvos

Step 1. Press and release the SALVO mode button to enter Salvo mode.

Step 2. Press and release the desired salvo button. (1-32 on the MX-RCP16 and 1-64 on the MX-RCP32.)

Step 3. The button flashes to indicate press, and the stored command sequence is sent to the matrix router.

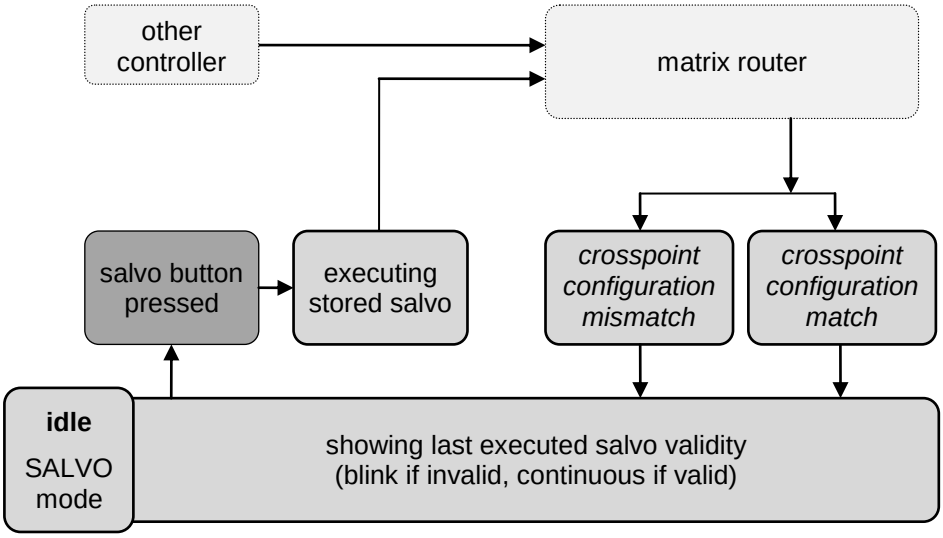
a) In verified salvo mode the pressed button stays illuminated only if the command sequence contained only switch commands, and the response from the matrix meets the required configuration. Otherwise the pressed button blinks.

If the salvo was executed correctly, but later the matrix configuration is changed (e.g. switching is done directly on the router's front panel), than the salvo button starts to blink. This indicates that the current crosspoint configuration does not match the previously selected salvo.

If the crosspoint configuration changes to a state that meets the last executed salvo, then the salvo button changes to continuous illumination.

b) In free salvo mode the pressed button stays illuminated disregarding the response.

4.4.3. Verified salvo operations flowchart



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4.5. Operation in UDC mode

The UDC protocol is developed to integrate with third party solutions. This way the front panel operations depend on the third party system, thus not described in this documentation.

See section XX about the UDC protocol.

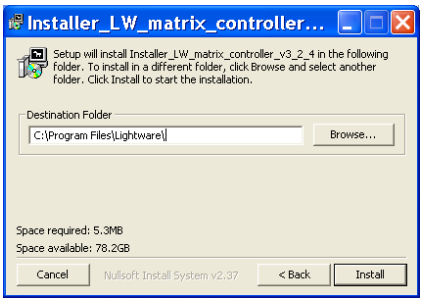
5. Using Lightware Matrix Controller

5.1. Installing the Matrix Controller software

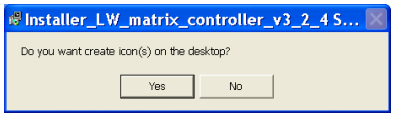
Step 1. Run Installer_LW_matrix_controller_v3_2_4.exe

Installer_LW_matrix_controller...
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
LW Matrix Controller 3.2.4 (required)
Start Menu Shortcuts
Space required: 5.3MB
Cancel
Nullsoft Install System v2.37
Next >

Step 2. Select destination folder and click Install (Using the default path is highly recommended)


Installer_LW_matrix_controller...
Setup will install Installer_LW_matrix_controller_v3_2_4 in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\Program Files\Lightware\
Browse...
Space required: 5.3MB
Space available: 78.2GB
Cancel
Nullsoft Install System v2.37
< Back
Install

Step 3. If you want to create desktop icon click Yes in the next pop-up window:



Step 4. After finishing the installation the following message appears:

Step 5. To run Lightware matrix control software find the shortcut icon in Start menu → Programs → Lightware → LW_matrix_controller_vXXX or on the desktop, and double click:

Uninstalling

To uninstall the control software double click on: Start menu → Programs → Lightware → Uninstall_LW_matrix_controller_vXXX.exe

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5.2. Establishing the connection

The unit can be controlled from a Windows computer using Lightware Matrix Controller software through Ethernet port.

Step 1. Connect the matrix switcher and the computer via

- Ethernet through a LAN hub, switch or router
- Ethernet directly (with cross UTP cable)

Info *If the connection is made through the router's Ethernet port, be sure that the computer is in the same network as the router.*

Info *If the computer has multiple Ethernet connections (for example WiFi and LAN connections are used simultaneously) you will have to know the IP address for the one that is used for controlling the matrix.*

Step 2. Start the application

To run the CONTROL SOFTWARE double click on the icon of the software on the desktop or select proper shortcut from Start Menu → Programs → Lightware folder.

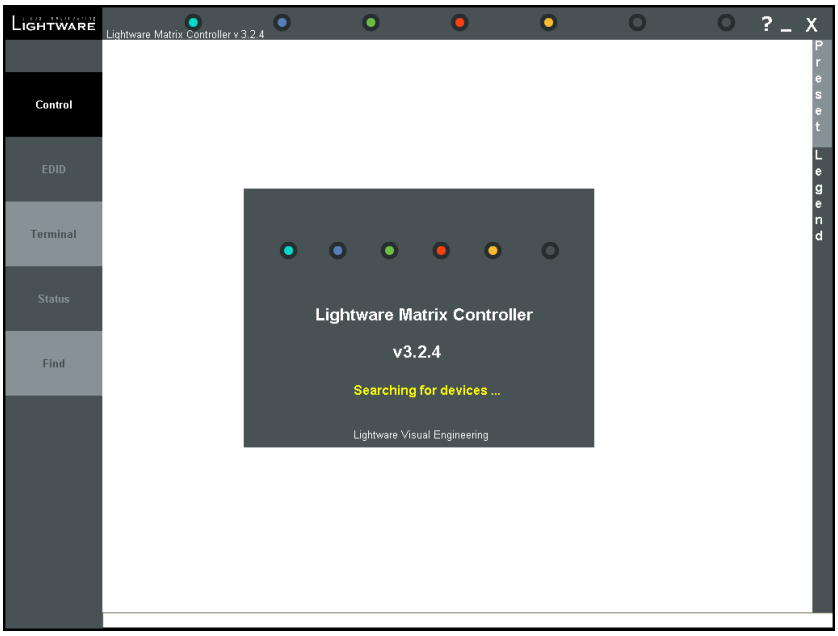

Figure 5-1. Matrix Controller software startup

PRELIMINARY VERSION

Step 3. The Find dialog appears automatically

The software picks the primary Ethernet interface, and shows the available Lightware devices on that port. The device type and the serial number are displayed automatically. Click the desired device, to highlight it.

If the computer has more Ethernet ports (for example WiFi and LAN connections are used simultaneously), you must select the one that is used to control the router from the drop-down list. If you are unsure which one to use, try to search for devices on all of them.

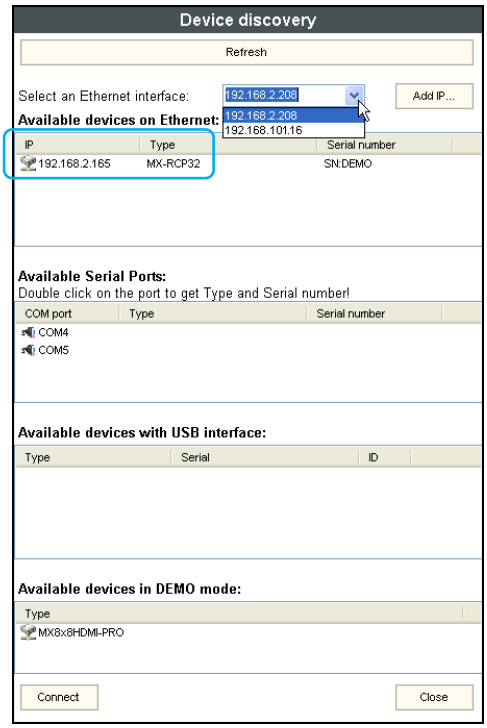

Figure 5-2. Ethernet connection

Step 4. Click on the Connect button to connect to the device

Info: *If the router is not listed in the "available devices on Ethernet" box, try searching again, or see check the other Ethernet interfaces as well.*

Info: *Only one user is allowed to connect to the RCP unit via Ethernet.*

Info: *Be sure that the firewall is not blocking the application!*

Step 5. The RCP enters configuration mode when the software connects to it. The three operation mode buttons are blinking simultaneously to indicate this. While in configuration mode, the front panel operations are ignored on the RCP unit.

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When the Lightware Matrix Controller finds the hardware, it determines the product type, and the control menu appears.

5.3. Control menu

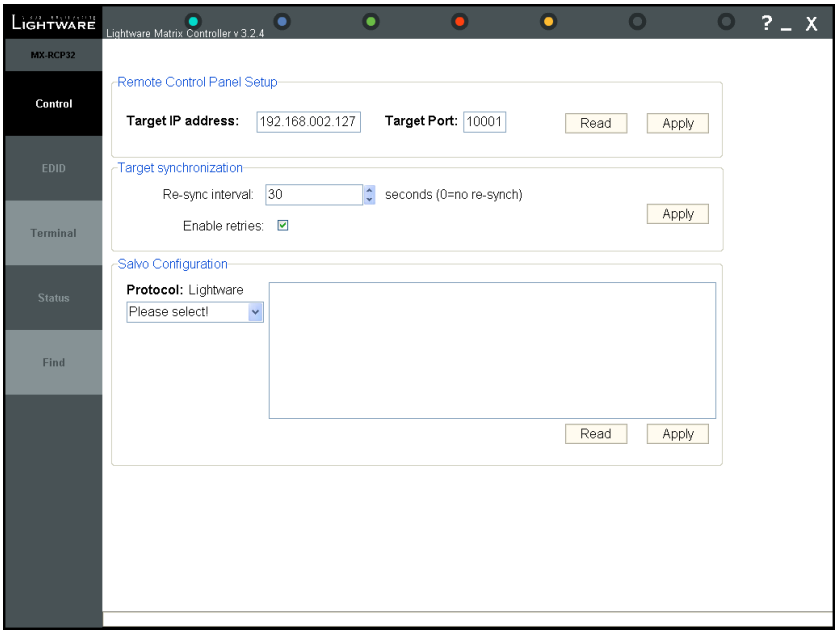

Figure 5-3. RCP control menu

5.3.1. Controlled target

In the upper frame, the target IP address and port number of the matrix router or the UDC server is displayed. The currently set target is inquired and displayed upon connection.

To change the controlled target, type the IP address and port, then press Apply. The IP address must be typed with all leading zeros in the dot-decimal notation. (e.g. write 192.168.002.205 instead of 192.168.2.205)

The IP address and port of a matrix router can be checked on the front panel LCD on the matrices or the devices can be discovered with the FIND dialog in the Matrix Controller software.

5.3.2. Salvo commands

In the lower frame the SALVO command sequences can be set up. Salvo commands can be used to execute a sequence of commands with one press of a button. One command sequence is stored for each button.

The RCP stores a total of 128 command sequences: 64 for Lightware protocol and another 64 for the secondary protocol. The control software displays if Lightware or Secondary protocol is active for remote controlling, and shows only the 64 salvos that belong to the actual protocol. The other 64 salvos are not accessible and not affected.

Storing salvos

Each salvo memory can store a maximum is 512 character long command sequence. Each command has to be typed including { } brackets. Any commands can be stored, but when verified salvo mode is used, only switching commands are sent. If a stored salvo contains switching and other commands as well, the non-switching commands are omitted. When using free salvo mode, any string in the salvo memory is sent to the matrix.

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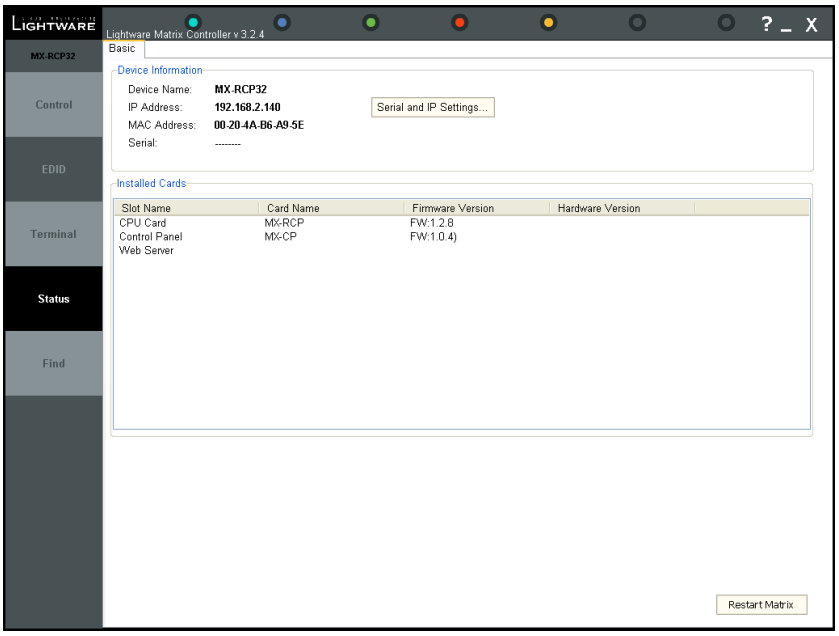
Salvo commands are sent as a batch. In most cases, batch commands are processed just as if they were sent one by one, but for switching commands, the router groups them, and executes switching in one step. The grouping is done only if the switching commands are received after each other, without any interruption (e.g. other command sent between switch commands). For example the salvo {02@01}{05@04} results in group switching but the salvo {02@01}{+06}{05@04} does not resulted group switching, because another command get between.

5.4. Status menu

Basic device information, such as the RCP unit's IP address and the serial number are displayed in this window. The firmware versions can be checked in the lower frame.



5.4.1. IP settings

The RCP unit's IP settings can be viewed by clicking on the "Serial and IP Settings..." button.

These settings are independent from the controlled target settings. However, the RCP unit has to be in the same subnet as the controlled matrix. The RCP unit's port number is used only by the control software when connecting to the RCP unit.

The controlled target's IP address and port number can be set in the control menu. See section *5.3.1* for more information.

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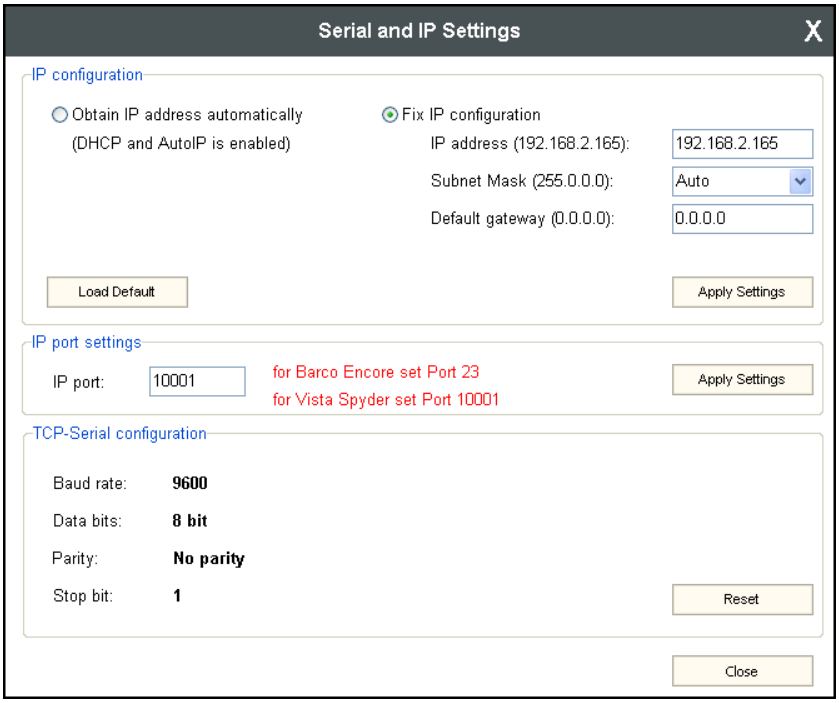

Obtain IP address automatically

By selecting the "Obtain IP address automatically" option, the RCP unit gets the IP address from the DHCP server on the LAN, or if DHCP server is not present, it gets an AutoIP address from the 169.254.xxx.xxx domain.

Fix IP configuration

In this case, the RCP unit has an IP address configuration set up by the user/administrator. The earlier saved configuration is shown in brackets.

Step 1. Select the "Fix IP configuration" option.

Step 2. Type in the IP address, select the desired subnet mask and type in the gateway IP address.

Step 3. Click on "Apply Settings" button. Depending on the modified settings, you might need to restart the RCP and the Matrix Controller Software.

Info: *The "Load Default" button loads the factory default IP settings to the fields, which contain a fix configuration:*

IP Address: *192.168.254.254*
Subnet Mask: *255.255.0.0*
Default Gateway: *0.0.0.0*

IP port settings

The RCP unit can be accessed via this TCP/IP port number with TCP connection. This number can be modified to any number between 1025 - 65535 except the followings: 9999, 14000 - 14009, 30704, and 30718.

Info: *This port number is independent from the target port number.*

Info: *The IP port number is 10001 by default.*

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6. Programmer's reference

6.1. Matrix control protocols

When protocol 1, 2, 4 or 5 are set, the RCP unit sends and accepts commands that are described in the user's manual of Lightware matrix routers.

6.2. UDC protocol

In UDC mode the RCP unit connects to a TCP server on a specified IP address and port. See section 5.3.1 about configuring the target. The RCP unit sends a command if a button is pressed down or released. The LEDs can be switched ON/OFF/BLINK by sending command to the RCP.

Buttons and LEDs are referred with their number as 1..32 on MX-RCP16 and 1..64 on MX-RCP32. The special function buttons and LEDs are referred as F1..F8 on both units.

Legend for protocol

<BTN>	=	button name 1..64 or F1..F8 (in ASCII format)
<LED>	=	LED name 1..64 or F1..F8 (in ASCII format)
CrLf	=	Carriage return, Line feed (0x0D, 0x0A)
●	=	space character (0x20)
→	=	each command issued by the TCP server, sent to the RCP unit
←	=	each response received by the TCP server, sent by the RCP unit

6.2.1. Sent responses

Button pressed down

Format	Example
Response {D<BTN>}CrLf	← (D5)

Button released up

Format	Example
Response {U<BTN>}CrLf	← (UF3)

6.2.2. Accepted commands

Turn LED on

Format	Example
Command {on@<LED>}CrLf	→ {ON@6}

Turn LED off

Format	Example
Command {off@<LED>}CrLf	→ {OFF@4}

Blink LED

Format	Example
Command {blink@<LED>}CrLf	→ {BLINK@F2}

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7. Specifications

General

Compliance ..... CE, UL, FCC
EMI/EMC ..... EN 55103-1, EN 55103-2
Safety ..... EN 60065 Class I
Warranty ..... 3 years
Operating temperature ..... -20°C ~ +50°C
Humidity ..... 10 ~ 90% RH

Power

Power adaptor (wall plug type) ..... 100-240 V AC; 50~60 Hz / 5V DC; 1 A
Power consumption ..... max 2 W (7 BTU/hour)
DC power connector ..... 2.5/5.5 mm barrel plug

Enclosure (MX-RCP16)

Rack mountable ..... Yes, 1U high
Material ..... 1 mm steel
Dimensions ..... 446/482W x 55D x 44H mm (17.6/19W x 2.2D x 1.7H inch)
Net Weight ..... TBD

Enclosure (MX-RCP32)

Rack mountable ..... Yes, 2U high
Material ..... 1 mm steel
Dimensions ..... 446/482W x 55D x 89H mm (17.6/19W x 2.2D x 3.5H inch)
Net Weight ..... TBD

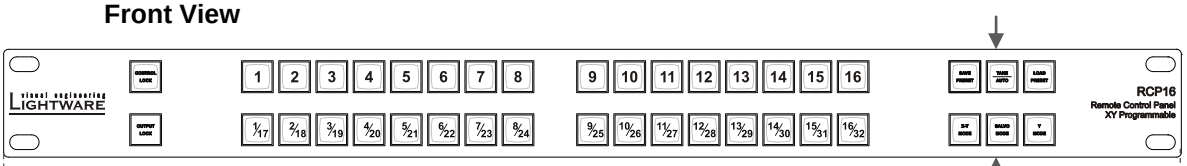
Network connection

Ethernet port connector ..... RJ45 female connector
Ethernet protocol ..... TCP/IP, HTTP, TFTP, Telnet
IP address assignment ..... fixed, DHCP, BOOTP, and AutoIP

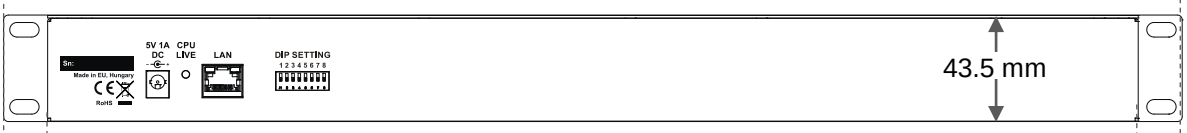
PRELIMINARY VERSION

7.1. Mechanical Drawings (MX-RCP16)

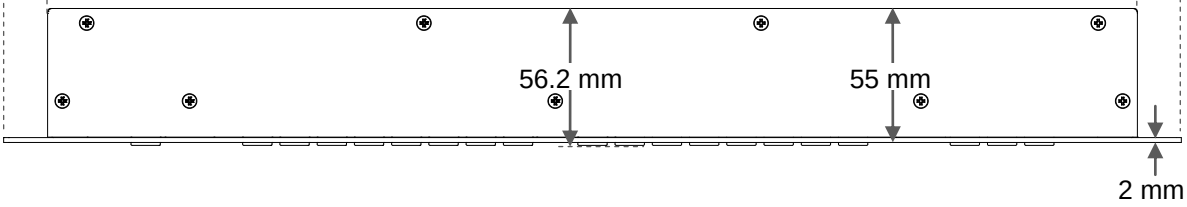
Front View



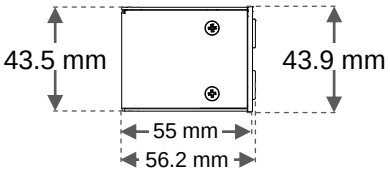
Rear View



Top View



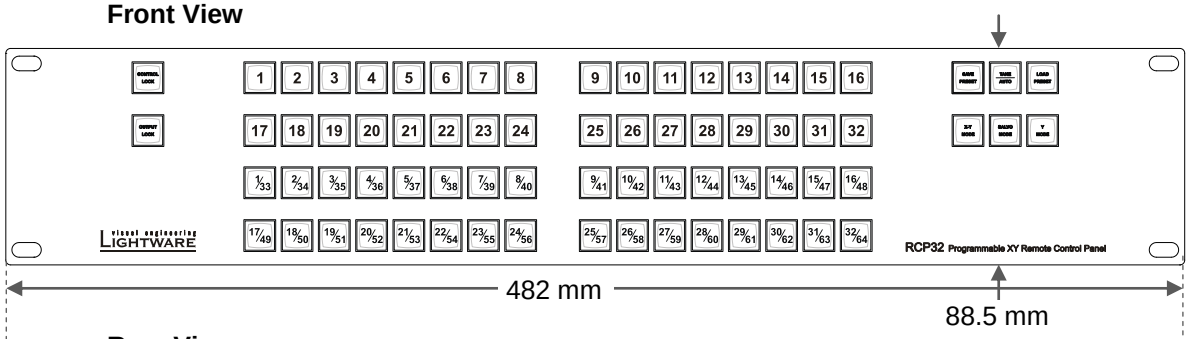
Side View



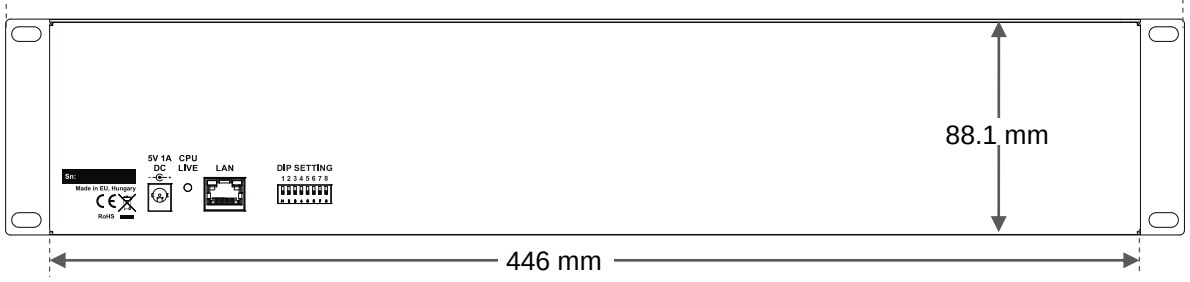
PRELIMINARY VERSION

7.2. Mechanical Drawings (MX-RCP32)

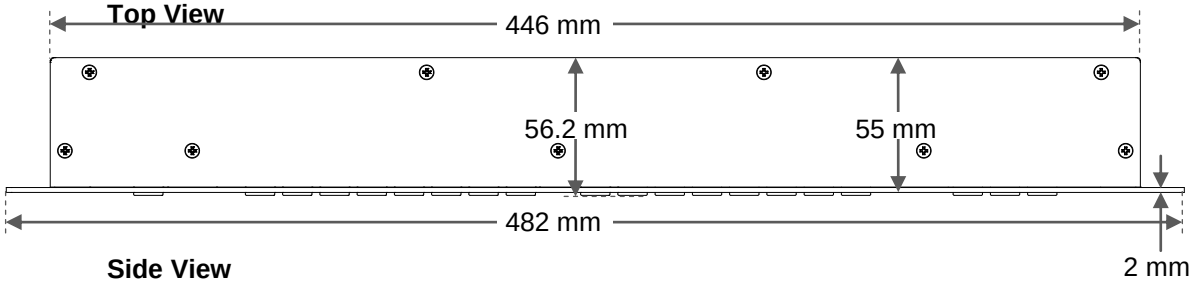
Front View



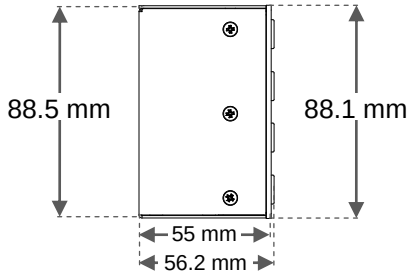
Rear View



Top View



Side View



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8. Version applicability

This User's Manual applies to the following versions of the mentioned software, firmware and hardware:

	version
Lightware Matrix Controller software	3.2.4
Lightware Bootloader software	3.2.1
MX-RCP firmware	1.2.8
MX-RCP Web Server	1.0.0
MX-RCP Web Content	DISABLED
MC-RCP card hardware	PCB 1.1
Control Panel firmware (MX-CP1)	1.0.4
RCP enclosure	1.0

9. Warranty

Lightware Visual Engineering warrants this product against defects in materials and workmanship for a period of three years from the date of purchase.

The customer shall pay shipping charges when unit is returned for repair. Lightware will cover shipping charges for return shipments to customers.

In case of defect please call your local representative, or Lightware at

Lightware Visual Engineering

1071. Budapest Peterdy str. 15, HUNGARY

Tel.: +36 1 889 6177

Fax: +36 1 342 9903

E-mail: support@lightware.hu

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10. Quality Check Record

Model name	Serial number	Date of manufacture	Checked

Hardware

Module	Hardware	Firmware
RCP board		
CPU & Control Panel 1		
Control Panel 2 (only for MX-RCP32)		
LAN control server		
MAC address	: : : : :	

Electrical check

+3.3V; +5V ☐

CPU Live ☐

Buttons ☐

LAN ☐

PRELIMINARY VERSION

11. Document revision history

Document	Release Date	Changes	Checked by
Rev. 1.0			
Rev. 0.8	01-11-2010	preliminary edition	Tamas Lehel
Rev. 0.1	20-09-2010	draft	-

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